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UK CL (Edition M) G4H HNEE HNEM HRCE HRCS
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(54) Anti-theft device for a car using the radio-paging network

(57) An anti-theft device for a car using the radio-paging network includes a radio-pager (21) electrically connected to an actuator (20). When the owner of the car finds that his car is stolen, he calls the radio-pager (21), which triggers the actuator (20), which actuates a microprocessor (10) to turn on a power control switch (37), which actuates a power-off timer (30) and displays (40). Since being actuated, the power-off timer (30) counts for a period of time, displaying the down-counting time period to the thief and warning him to pull the car over to the road side. In the meantime, another display (40) has a flashing message for telling others to call the police. When the predetermined time period is counted through, the power- off timer (30) enables the microprocessor (10) to lock the doors, the windows, the engine hood, the trunk lid, and the ignition lock and cut off the power supply to the car.

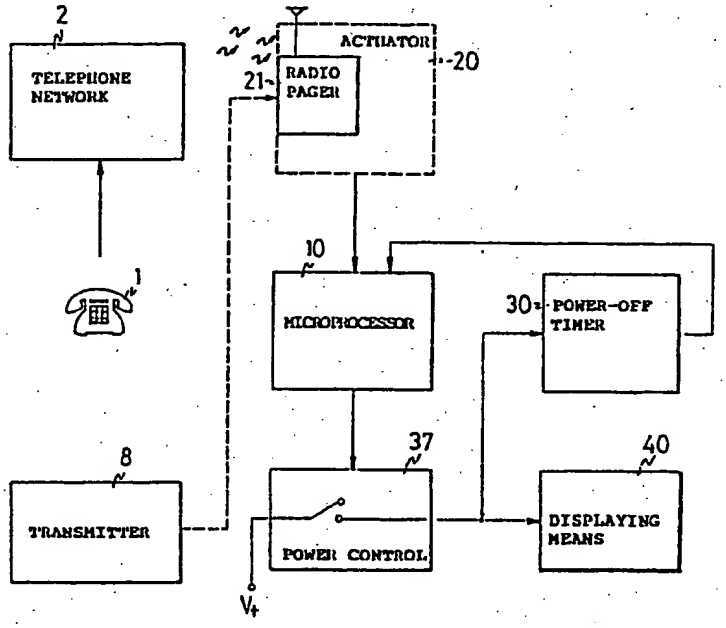

FIG 1

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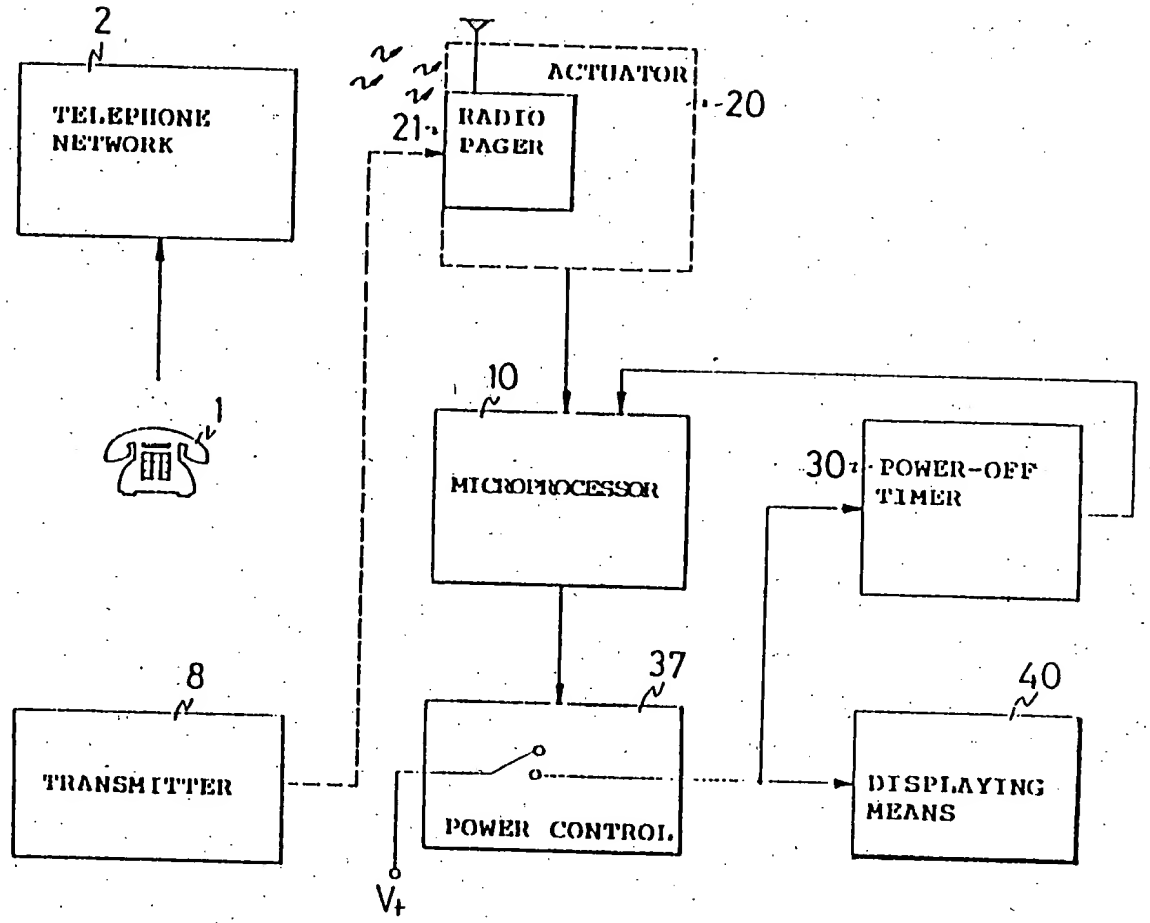
2
TELEPHONE NETWORK
ACTUATOR
20
21
RADIO PAGER
1
10
MICROPROCESSOR
30
POWER-OFF TIMER
8
TRANSMITTER
37
POWER CONTROL
40
DISPLAYING MEANS
V_+

FIG 1

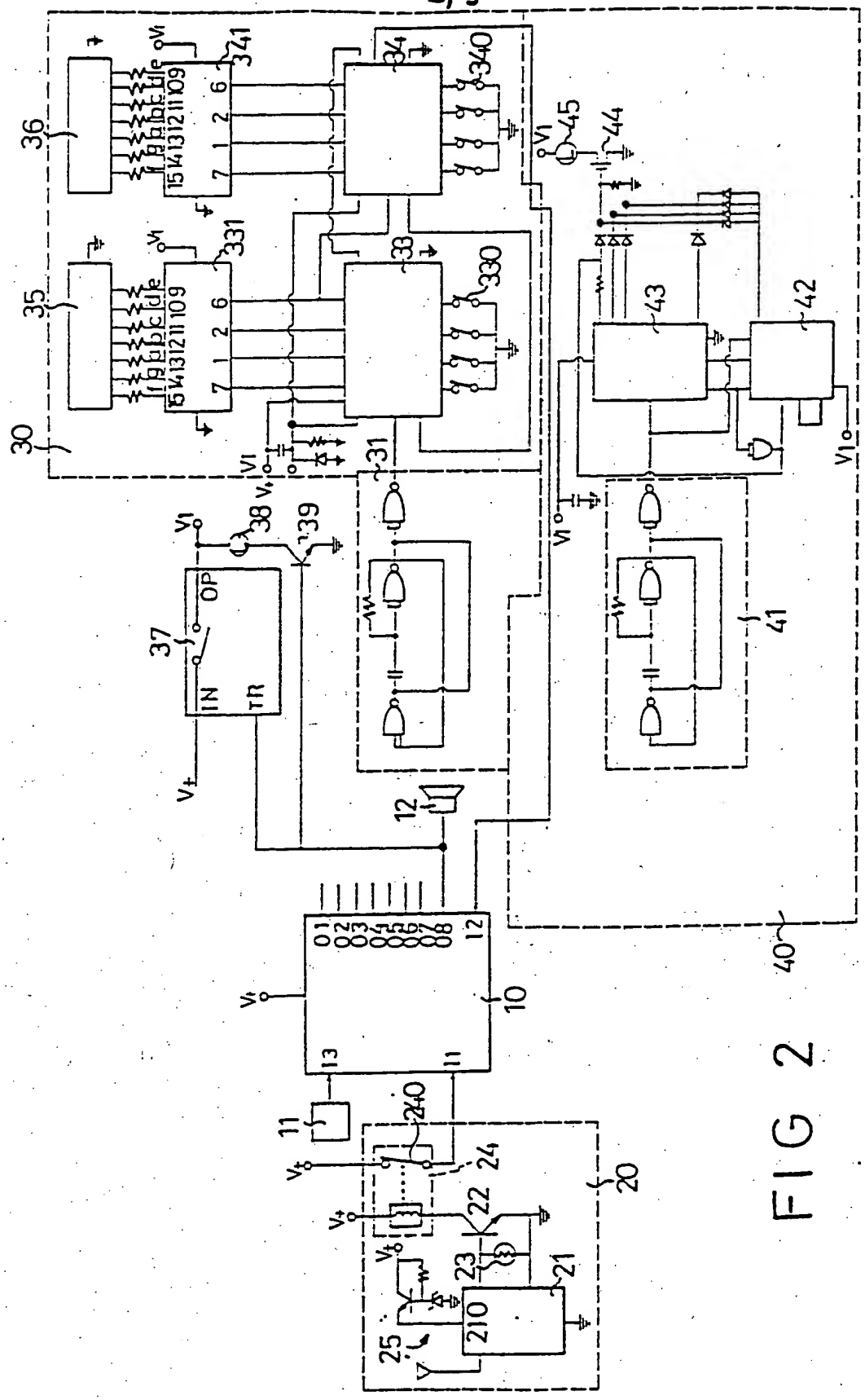
30
31
33
330
331
34
340
341
35
36
37
38
39
40
41
42
43
44
45
10
11
12
20
21
22
23
24
240
25
210
OP
IN
TR
V+
V1

FIG 2

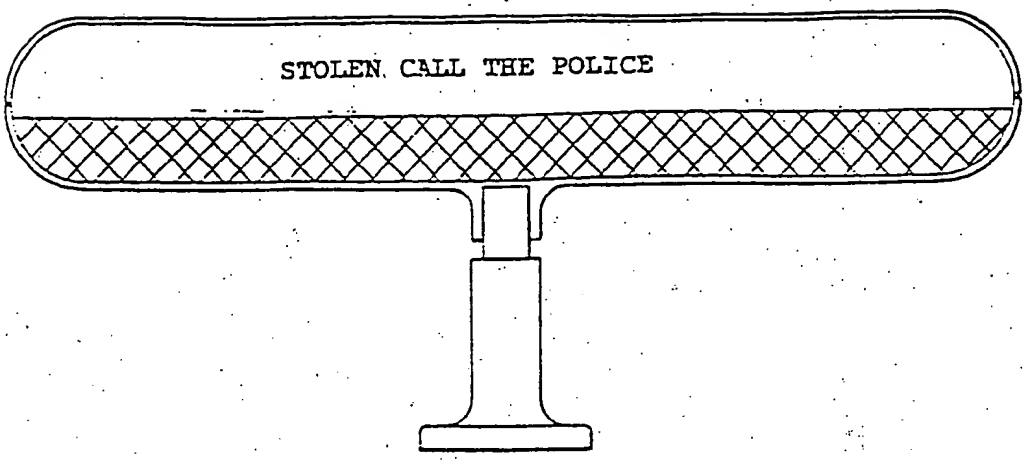
STOLEN. CALL THE POLICE

FIG 4

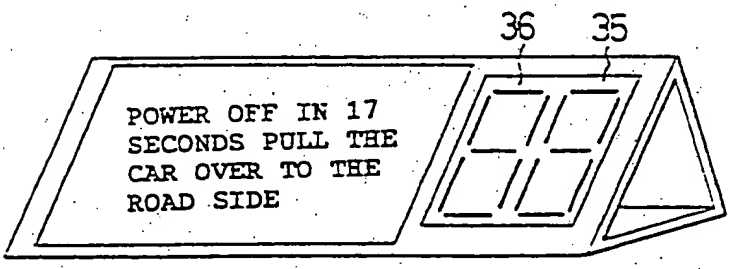
36
35
POWER OFF IN 17
SECONDS PULL THE
CAR OVER TO THE
ROAD SIDE

FIG 3

ANTI-THEFT DEVICE FOR A CAR USING THE RADIO-PAGING NETWORK

This invention relates to an anti-theft device for a car using the radio-paging network.

The anti-theft device for a car used at the present time usually can emit alarming sound when an approaching action happens in a predetermined range. However, in some cases, the car is still stolen by a thief. Therefore, it is requisite to develop a new anti-theft device which is installed in the car and is allowed to be controlled by the owner even when the thief has already stolen the car.

The present invention provides an anti-theft device which includes a radio-pager functioning as a driver to activate an alarming means and a microprocessor which is connected to a power control switch and control the latter to turn on/off. A power-off timer and a displaying means are connected to the power control switch and are actuated thereby. When the user finds that his car is stolen, he calls the pager, causing the microprocessor to turn on the power control switch, which in turn actuates the power-off timer and the displaying means. The power-off timer is actuated to count down from a predetermined period of time to zero

and feeds back a signal to the microprocessor to turn off the power supplying to the car thus stopping the car.

It is another object of the present invention to provide an anti-theft device having a first warning device for informing the thief that he has a predetermined time period to pull over to the road side.

It is another object of the present invention to provide an anti-theft device having a second warning device for informing other persons that the driver in the car is a thief.

These and additional objects, if not set forth specifically herein, will be readily apparent to those skilled in the art from the detailed description provided hereunder, with appropriate reference to the accompanying drawings.

Fig. 1 is a block diagram of an anti-theft device in accordance with the present invention;

Fig. 2 is a detailed circuit of the anti-theft device in accordance with the present invention;

Fig. 3 is an outlook of a first display means of the present invention; and

Fig. 4 is an outlook of a second display means of

the present invention.

The anti-theft device of the present invention is an auxiliary device which is allowed to cooperate with other anti-theft devices to provide an anti-theft function. In the present embodiment, when the car is broken into by a thief, the anti-theft device of the present invention will inform the user by generating an alarming signal to a receiver of the owner. The owner may go to the parking lot immediately and catch the thief, or he may use a telephone to command his car in a remote control way and stop the car (if the car is moving) in a predetermined time period. Referring to Fig. 1, a block diagram of an anti-theft device is illustrated. The anti-theft device comprises a radio-pager 21 for receiving phone instruction from the user, an actuator 20 electrically connected to the radio-pager 21, a microprocessor 10 electrically connected to the actuator 20, a power control switch 37 electrically connected to the microprocessor 10, a power-off timer 30 electrically connected to the power control switch 37, and a displaying means 40 electrically connected to the power control switch 37. The microprocessor 10 is further connected to a well known driving device which is further connected to the doors the windows, the engine hood, the trunk lid and the ignition lock of the car, and can be actuated by the actuator 40 to turn on

the power control switch 37, which in turn enables the power-off timer 30 and the displaying means 40. When the power-off timer 30 is enabled, it will count down from a predetermined period of time to zero and trigger the microprocessor 10 to lock the doors, cut off the supply of electrical power and thus the gasoline to the car. The power-off timer 30 connected to the power control circuit 37 is allowed to show the dynamically counting down time period for cutting off the power to the car.

The displaying means 40 is also controlled by the power control switch 37 and will show a warning such as "STOLEN call the police". A transmitter 8 is controlled by the user for transmitting control command to the actuator 20 to cut off the electrical power supply when the user finds a thief is stealing the car. Since the transmitter 8 is well known, it is not described in detail herein. A telephone set 1 and a telephone network 2 are shown in Fig. 1 only for illustration and are not included in the anti-theft device of the present invention.

From Fig. 1 one can also understand the functional procedure of the anti-theft device. First, the user calls the radio-pager 21 by the telephone set 1. Second, the telephone network 2 transmits the phone call

to the radio-pager 21. Third, the radio-pager 21 enables the actuator 20, which in turn actuates the microprocessor 10. Fourth, the microprocessor 10 responds to the actuation from the actuator 20 and turns on the power control switch 37. Fifth, the power control switch 37 enables the power-off timer 30 and the displaying means 40 by providing the requisite electrical power thereto. Sixth, the power-off timer 30 counts down from a predetermined time period to zero and enables the microprocessor 10 to cut off the supply of electrical power and gasoline to the car, thus limiting the car's movement; in the mean time ,the displaying means 40 is enabled to display some wording such as "STOLEN, call the police" to ask help from other persons. If the owner does not make the phone call at the appropriate time and loses the car, he still can make the phone call and the anti-theft device will function as mentioned. IF the owner is near the site from where the car is being stolen, he can emit a control signal from the transmitter 8 causing the actuator 20 to enable the microprocessor 10, which in turn cuts off the power supply and the gasoline supply to the car in a period time, thus limiting the car's movement and preventing the thief from stealing the car.

Fig. 2 illustrates the detail circuit for the microprocessor 10, the actuator 20, the power control

switch 37, the power-off timer 30, and the displaying means 40. The microprocessor 10 functions as a control center of the whole circuit. A DC voltage V+ is used as the power source for the whole circuit. The power source V+ is easily obtained from the car battery by a well known voltage pull-down device (not shown), which is not mentioned in detail herein. The actuator 20 comprises the radio-pager 21 which has two output terminals respectively connected to the base and the emitter of a transistor 22. A photo-resistor 23 is connected between the base and the emitter of the transistor 22. A relay 24 is connected to the collector of the transistor 22. The relay 24 has a switch 240 interconnected between the power source V+ and a first input terminal 11 of the microprocessor 10. The radio-pager 21 has a power input terminal 210 for connecting to the power source V+ via a pull-down circuit 25. Since the power source V+ is too great for the radio-pager 21, the pull-down circuit 25 is interconnected between the power source V+ and the power input terminal 210. The pull-down circuit 25 comprises a transistor, a resistor, and a zener diode for pulling down some voltage from the voltage source V+ and providing an appropriate voltage suitable for the radio-pager 21. When the user calls the radio-pager 21, the latter generates a first triggering signal to trigger the relay 24, which in turn generates a second

triggering signal to actuate the microprocessor 10.

The microprocessor 10 has a plurality of output terminals 01 to 07 connected to a well known driving device which is further connected to the ignition lock, the engine hood, the doors, the windows, and the trunk lid of the car. Notice that the ignition lock as mentioned is used to turn on/off the power supply to the car. However, the well known driving device is not limited to connect to the above members of the car. It might only connect to the ignition lock of the car for controlling the power supply to the car. When the anti-theft device is actuated, the microprocessor 10 is actuated to close the ignition lock, the engine hood, the doors, and the trunk lid in a predetermined period of time. The predetermined period of time is adjustable as will be described later. Another output terminal 08 of the microprocessor 10 is connected to a buzzer 12, thus when the microprocessor 10 is actuated by the actuator 20, it will respond to generate a third triggering signal to trigger the buzzer 12, which in turn emits alarming sound. The output terminal 08 of the microprocessor 10 also connects to a trigger terminal TR of the power control switch 37 for turning on the latter upon the microprocessor 10 being actuated by the second triggering signal from the actuator 20. A second input terminal 12 of the microprocessor 10 is

connected to the power-off timer 30 for receiving a feedback signal terefrom as will be described in detail later. The microprocessor 10 responds to close the ignition lock, the engine hood, the doors, and the trunk lid when receiving the feedback signal from the power-off timer 30.

The power control switch 37 basically functions as a relay which has a first input terminal IN connected to the power source V+, the triggering terminal TR connected to the microprocessor 10, and an output terminal OP for outputting a voltage V1. Normally the power control switch 37 is in off (open) status, i.e., the output voltage V1 is zero. After the triggering terminal TR of the power control switch 37 is triggered by a triggering signal from the microprocessor 10, the switch 37 is turned on, causing the output voltage V1 equalling to the power source V+. The power control switch 37 also provides the requisite power to the power-off timer 30 and the displaying means 40, as can be seen by the symbols V1s shown in the power-off timer 30 and the displaying means 40. The physical connection between the power control switch 37 and the power-off timer 30, displaying means 40 is omitted herein. A first warning light screen 38 is electrically connected to the output terminal OP of the power control switch 37 is actuated by the microprocessor 10, the warning light

screen 38 will be turned on and show the wording such as "power off in seventeen seconds, pull the car over to the road side", as illustrated in Fig. 3. Since the warning light screen 38 is well known in this field, it is not described in detail herein. A transistor 39 having the collector thereof connected to the warning light screen 38, the base thereof connected to the output terminal 08 of the microprocessor 10, the emitter thereof connected to a ground is in "off" status normally, and is in "on" status when the power control switch is triggered by the microprocessor 10.

The power-off timer 30 is controlled by the power control switch 37, since the latter provides the timer 30 requisite power source V1. The power-off timer 30 comprises a first oscillator 31 for providing clock pulses, a first counter 33 for receiving and counting said clock pulses having a first setting switch 330, a second counter 34 having a second setting switch 340 being connected to said first counter 33. A first decoder 331 is connected between the first counter 33 and a first seven-segment display screen 35 for faithfully displaying the counted value on the screen 35. A second decoder 341 is connected between the second counter 34 and a second seven-segment display screen 36 for faithfully displaying the counted value on the screen 36. The first counter 33 and the second

counter 34 together constitute a two-digit down counter showing the counting value on the screens 35, 36 for warning the illegal occupant to pull over the car in a predetermined period of time. The user calls the radio-pager 21, triggering the actuator 20, which in turn triggers the microprocessor 10, turning on the power control switch 37, which in turn enables the counters 33, 34 to count.

When the microprocessor 10 outputs a third triggering signal to actuate the buzzer 12 and the power control circuit 37, the latter responds to switch on and provide requisite electrical power to the counters 33, 34. The counters 33, 34 starts to count down from a predetermined time period to zero and dynamically shows the counting value on the screens 35, 36.

When the timer 30 counts to zero, i.e., the counter 33,34 both count to zero, an output terminal thereof will output a feedback signal to the second input terminal of the microprocessor 10, which in turn responds to cut off the electrical power to the car, thus stopping the car. The predetermined time period for counting to zero is adjustable by manually operating the switches 330 and 340.

The displaying means 40 comprises a second

oscillator 41, a third counter 42, and a fourth counter 43. The second oscillator 41 generates clock pulses for the fourth counter 43 to count. The fourth counter 43 is a decimal counter which has an output terminal electrically connected to a transistor 44 which further connects to a second light screen 45 having the message such as "STOLEN call the police", as shown in Fig. 4. The counters 42, 43 together actuate the transistor 44 to turn on periodically, which in turn enables the second light screen 45 to flash in a constant frequency and attract the other drivers or passengers to notice that the car is occupied by a thief. The second light screen 45 may be installed in the rear window of the car or other place thereof. Normally the second light screen 45 is in "off" status. The second light screen 45 is turned on when the displaying means 40 is actuated, thus flashing the wording as mentioned previously. The requisite power to the displaying means 40 is provided by the power control switch 37, which is further controlled by the microprocessor 10. Therefore the power-off timer 30 and the displaying means 40 are activated synchronously by the power control switch 37 and are turned off synchronously when the microprocessor 10 cuts off the power supply to the car.

The microprocessor 10 has a third input terminal 13 connected to a vibration sensor 11 which transmits a

triggering signal to the microprocessor 10 when detecting shaking of the car which is originally in "parking" status. The microprocessor 10 responds to actuate the power-off timer 30 and the displaying means 40 when receiving the triggering signal from the vibration sensor 11. The detail of the vibration sensor 11 is well known in this field and not described in detail herein.

While the present invention has been explained in relation to its preferred embodiment, it is to be understood that various modifications thereof will be apparent to those skilled in the art upon reading this specification. Therefore, it is to be understood that the invention disclosed herein is intended to cover all such modifications as fall within the scope of the appended claims.

CLAIMS:

1. An anti-theft device for a car using the radio-paging network comprising

a radio-pager (21) for receiving a phone call from a user and responding to generate a first triggering signal;

an actuator (20) comprising a first switch (22) and a first relay (24), said first switch (22) being electrically interconnected between said first relay (24) and a ground and being triggered "on" by said first triggering signal, which in turn enables said first relay (24) to generate a second triggering signal;

a microprocessor (10) electrically connected to said actuator (20) for responding to said second triggering signal and generating a third triggering signal, said microprocessor (10) having a plurality of output terminals (01 to 07) to control the locking of the doors, the engine hood, the trunk lid, and the ignition lock of the car, said microprocessor (10) further comprising an output terminal (08) for outputting a third triggering signal responding to the second triggering signal from said actuator (20);

a power control switch (37) being electrically connected to said microprocessor 10 for responding to said third triggering signal from said microprocessor (10) and being turned on to transmit a power source (V+)

from an input terminal (IN) thereof to an output terminal (OP) thereof;

a power-off timer (30) being electrically connected to said output terminal (OP) of said power control switch (37) and activated thereby when said power control switch (37) is turned on; said power-off timer (30) starting to count down from a predetermined time period to zero and output a fourth triggering signal to said microprocessor (10), thus enabling said microprocessor (10) to lock the doors, the engine hood, the trunk lid, and the ignition lock of the car.

2. The anti-theft device as claimed in claim 1, wherein said power-off timer (30) comprising an oscillator (31), a first counter (33) having a first setting switch (330), a second counter (34) having a second setting switch (340), a first seven-segment display screen (35) for faithfully displaying the counted value of said first counter (33), a first decoder (331) being connected between said first counter (33) and said first screen (35), a second seven-segment display screen (36) for faithfully displaying the counted value of said second counter (34), a second decoder (341) being connected between said second counter (34) and said second screen (36), said first counter (33) and said second counter (34) together constitute a two-digit down counter showing the counting

value on said first and second screens (35, 36) for warning the illegal occupant to pull over the car in a predetermined period of time.

3. The anti-theft device as claimed in claim 1 further comprising a first warning light screen (38) electrically connected to said output terminal (OP) of said power control switch (37), such that when said power control switch (37) is actuated by said third triggering signal form said microprocessor (10), the first warning light screen (38) will be turned on and warns a thief to pull the car over to the road side.

4. The anti-theft device as claimed in claim 1 further comprising a displaying means 40 comprising a second oscillator (41), a third counter (42), and a fourth counter (43), said fourth counter (43) being a decimal counter which has an output terminal electrically connected to a transistor (44) which further connects to a second light screen (45) having warning message to tell other drivers to call police, said third counter (42) together with said fourth counter (43) periodically actuate said transistor (44) thus enable said second warning light screen (45) to flash with a corresponding frequency.

16

Patents Act 1977 Examiner's report to the Comptroller under Section 17 (The Search report)	Application number GB 9413527.4
Relevant Technical Fields (i) UK Cl (Ed.M) G4H (HRCE, HRCS, HNEE, HNEM) (ii) Int Cl (Ed.5) B60R	Search Examiner M J DAVIS Date of completion of Search 5 SEPTEMBER 1994
Databases (see below) (i) UK Patent Office collections of GB, EP, WO and US patent specifications. (ii)	Documents considered relevant following a search in respect of Claims :- 1-4

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A:	Document indicating technological background and/or state of the art.	&:	Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
Y	GB 2217081 A	(AUTO TRACER) eg abstract	1 at least
Y	EP 0307485 A1	(HONDA) eg pages 11-13,24	1 at least

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